

REMARKS

Claims 11, 18 and 20 have been canceled. Thus, claims 1, 2, 12-17, 19, 21-24, 29 and 30 are pending. The independent claims 1, 2 and 13 of the present application have been amended to distinguish over the prior art of record, and arguments are submitted for overcoming the obviousness rejections based on the combinations of the prior art of record. No new matter was added. Accordingly, Applicant respectfully submits that the present application is in condition for allowance.

Claim Rejections – 35 USC §103(a)

- A. In the non-final Office Action dated September 18, 2008, claims 1, 2 and 15-17 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 5,964,966 issued to Goyal et al.*

Independent claim 1 has been amended to include the limitations formerly stated in dependent claim 11, and independent claim 2 has been amended to include limitations formerly stated in dependent claims 18 and 20. No new matter was added.

For this reason, Applicant respectfully submits that independent claims 1 and 2, and dependent claims 15-17 which depend from claim 1, are patentable and are not obviated by the Goyal et al. patent. Accordingly, Applicant respectfully requests reconsideration and removal of the above-referenced obviousness rejection of claims 1, 2 and 15-17.

- B. In the non-final Office Action dated September 18, 2008, claims 11-14 and 18-24 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 5,964,966 issued to Goyal et al. in view of U.S. Patent No. 6,485,542 B2 issued to Shindo et al.*

Applicant respectfully submits that the invention recited in the claims of the present application would not be obvious to one of ordinary skill in the art for the following reasons.

(i) The Cited References Fail to Teach a Ni-Ta Sputtering Target

In the Office Action, it is stated that “Goyal et al. teach a substrate comprising nickel and at most 15 atomic percent of a Group VB metal”. With respect to a sputtering target, it is further reasoned that:

“... the substrate alloy may be deposited by sputtering (col. 12, lines 26-38, 59-61). Thus, it would have been obvious to one of ordinary skill in the art to form a sputtering target out of the disclosed composition because the substrate itself is made from a sputter deposition technique.”

Applicant respectfully submits that this reasoning unfairly overstates the disclosure provided by the Goyal et al. patent. On column 10, lines 24-39, Goyal et al. specifically list tantalum for forming an alloy with nickel and state that:

“These alloys can be deformed to deformations greater than 90% prior to a final annealing step by employing a rolling process wherein a thickness of less than 20 mils is achieved. Said rolled and annealed sheet can be used as a substrate for epitaxial growth of oxides and nitrides.”

Also, see column 12, lines 22-30, of Goyal et al. which states:

“Another embodiment of the subject invention comprises a binary alloy of ... 10at% or less of Ta ... These alloys can be cube textured by rolling to deformations greater than 90% prior to final annealing. Said rolled and annealed article sheet can be used as a substrate for epitaxial growth of oxides and nitrides ...”.

Thereafter, on column 12, lines 31-33, (directly before the section of the text cited in the Office Action) Goyal et al. state that “It is not possible to deform alloys of certain compositions to the reductions required to produce sharp biaxial textures required for applications.” The only example provided for the “certain composition” is a “Hastealloy C” deposited on a “thin strip of biaxially textured Cu.” See column 12, lines 40-46, of the Goyal et al. patent.

Accordingly, Goyal et al. clearly teach to one of ordinary skill in the art that a Ni-Ta alloy substrate is produced via rolling and annealing, not sputtering. According to the teachings of Goyal et al., the use of sputtering is used only for “certain compositions” that cannot be deformed to the reductions required to produce sharp biaxial textures. For this reason, Applicant respectfully submits that Goyal et al. fail to teach, disclose, or suggest a Ni-Ta alloy sputtering target. Further, Goyal et al. actually teach-away from a Ni-Ta alloy sputtering target because Goyal et al. teaches to one of ordinary skill in the art that a Ni-Ta substrate should be produced via rolling and annealing. Accordingly, one following the teachings of Goyal et al. is provided no common sense motivation for producing a Ni-Ta sputtering target.

Turning to the ‘542 Shindo patent, it also clearly fails to disclose the Ni-Ta alloy sputtering target required by independent claims 1, 2 and 13, as amended, of the present application.

For at least these reasons, Applicant respectfully submits that the claims of the present application are not obvious over Goyal et al. in view of the ‘542 Shindo patent.

(ii) It is not Obvious to Combine the Teachings of the Cited References

As discussed above, Goyal et al. fails to teach, disclose or suggest a Ni-Ta alloy sputtering target. In addition, Goyal et al. fail to provide any description of a sputtering target and/or its manufacturing process. It is even further clear that Goyal et al. fail to disclose a sputtering target of the purity required by independent claims 1, 2 and 13 of the present application and how such a sputtering target could be produced.

The ‘542 Shindo patent describes a Ni-Fe alloy sputtering target and a method of manufacturing a Ni-Fe alloy sputtering target including the steps of melting a raw material in

hydrochloric acid, and melting and alloying the high purity material obtained by performing ion exchange, activated carbon treatment and electrolytic refining. (For example, see the last four lines of the Abstract of the '542 Shindo patent.)

It is clear for multiple reasons that the Ni-Fe alloy sputtering target of the '542 Shindo patent is entirely different and has an entirely different composition from the substrate disclosed by Goyal et al. made of a Ni-based alloy including one or more alloy elements selected from VB group or VIB group metals, such as Ta.

Accordingly, since the Ni-based alloys are different, it would not be obvious for one of skill in the art to use the technology of the '542 Shindo patent to prepare a sputtering target of an alloy disclosed by the Goyal et al. patent. Even if the method of manufacturing a Ni-Fe alloy sputtering target disclosed by the '542 Shindo patent is used for an Ni-Ta alloy disclosed by Goyal et al., the result would not provide the same extremely reduced level of impurity content as that required by claims 1, 2 and 13 of the present application. This is because the manufacturing method disclosed and stated above for the '542 Shindo patent is directed for use with respect to a different composition and its process steps are entirely different to that of the present invention.

Further, the cited references provide opposite disclosures relative to magnetic properties of the alloy. The '542 Shindo patent is clearly directed to a "ferromagnetic Ni-Fe alloy" and clearly demands that "marked deterioration of magnetic properties" must be prevented.

In contrast, Goyal et al. relates to a paramagnetic material, not a ferromagnetic material. The Goyal et al. patent is directed to substrate technology for forming an oxide superconductor film, such as an YBCO film. Goyal et al. describe technology for forming a biaxially oriented Ni-based alloy substrate by optimizing rolling and annealing processes to seek high J_C by way of

biaxial orientation of the superconductor. With respect to prior art Ni substrates, Goyal et al. specifically state that:

“The preferred substrate used in the prior process comprised high purity Ni. Since Ni is ferromagnetic, the substrate as a whole is magnetic, which can cause significant problems in practical applications involving superconductors.” (see column 4, lines 46-50)

Thus, Goyal et al. clearly teach to one of ordinary skill in the art that if the Ni-based alloy is ferromagnetic, “significant problems” will be created and that this must be avoided. With respect to the alloys taught by Goyal et al., Goyal et al. teach that the alloy element must “significantly decrease” the Curie temperature of Ni so that the Ni-based alloy is “completely non-magnetic, which can be advantageous for superconductivity applications”. (See column 14, lines 9-11, of the Goyal et al. patent.) Also, see column 15, lines 49-52, of Goyal et al. which teaches that the substrate made according to Goyal et al. “results in a substrate that is cube textured, is non-magnetic at 77 K and is significantly stronger than Ni.”

Accordingly, Goyal et al. clearly teaches to one of ordinary skill in the art a Ni-based alloy having a reduced Curie temperature by optimizing the conditions of the additive alloy element, rolling, and heat process treatment and to provide a paramagnetic material even in a low temperature environment in which a superconductor is used. This is clearly in direct conflict with the opposite teachings of the ‘542 Shindo patent which requires ferromagnetic thin films for use as a spin valve film or the like. Thus, it would not be obvious for one of ordinary skill in the art to combine these cited references due to the differences in composition and requirements with respect to magnetic properties of the alloy.

For at least these reasons, Applicant respectfully submits that the claims of the present application are not obvious over Goyal et al. in view of the ‘542 Shindo patent.

(iii) Goyal et al. Fails to Disclose or Obviate the Magnetic Permeability Limitations

In the Office Action, it is admitted that Goyal et al. fails to disclose the limitations concerning magnetic permeability required by dependent claims 15, 16, 22 and 23 of the present application. However, in the Office Action, it is reasoned that “magnetic permeability would be expected to be the same in both the claimed product and the product of Goyal et al.”. Applicant respectfully disagrees and respectfully requests reconsideration.

As stated above, Goyal et al. teach an Ni-Ta alloy that is subject to rolling and annealing and that is required to have a crystal structure of a so-called “biaxial orientation” comprising a (100) face in relation to the planar direction and a $\langle 001 \rangle$ axis in relation to the rolling direction. The reason for the biaxial texture is that high current density characteristics greatly depend on the orientation of the superconductor film. Goyal et al. obtains the biaxial texture with a sharp cube texture by applying “heavy” rolling reduction exceeding 90% to the alloy in which the stacking fault frequency parameter at the time of 60% deformation is less than 0.01. The described biaxially textured substrate would not be suitable as a sputtering target or the material from which a sputtering target can be formed.

In addition, as also discussed above, Goyal et al. clearly teach to one of ordinary skill in the art that if the Ni-based alloy substrate is ferromagnetic, “significant problems” will be created and that this must be avoided. With respect to the alloys taught by Goyal et al., Goyal et al. teach that the alloy element must “significantly decrease” the Curie temperature of Ni so that the Ni-based alloy is “completely non-magnetic, which can be advantageous for superconductivity applications”. (See column 14, lines 9-11, of the Goyal et al. patent.) Also, see column 15, lines 49-52, of Goyal et al. which teaches that the substrate made according to

Goyal et al. “results in a substrate that is cube textured, is non-magnetic at 77 K and is significantly stronger than Ni.”

Accordingly, Applicant respectfully submits that one of ordinary skill in the art would expect the paramagnetic substrate disclosed and required by Goyal et al. not to have the magnetic permeability required by claims 15, 16, 22 and 23 of the present application. The present invention seeks to increase magnetic permeability and not to produce a paramagnetic material. Thus, Goyal et al. not only fail to disclose these claim limitations, Goyal et al. actually teaches away from a substrate having ferromagnetic properties.

For at least these reasons, Applicant respectfully submits that the claims of the present application are not obvious over Goyal et al. in view of the ‘542 Shindo patent.

Applicant respectfully requests reconsideration and removal of the above stated obviousness rejection for any of the reasons discussed above.

- C. *In the non-final Office Action of September 18, 2008, claim 29 is rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 5,964,966 issued to Goyal et al. in view of U.S. Patent No. 6,485,542 B2 issued to Shindo et al. and further in view of U.S. Patent No. 5,667,665 issued to Shindo et al.*

Applicant respectfully submits that dependent claim 29 is patentable over the above referenced rejection for the same reasons discussed above with respect to independent claim 2 being non-obvious and patentable over Goyal et al. in view of the ‘542 Shindo patent.

Accordingly, Applicant respectfully requests reconsideration and removal of this rejection.

- D. *In the Office Action of September 18, 2008, claim 30 is rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 5,964,966 issued to Goyal et al. in view of U.S. Patent No. 5,667,665 issued to Shindo et al.*

Applicant respectfully submits that dependent claim 30 is patentable over the above referenced rejection for the same reasons discussed above with respect to independent claim 1 being non-obvious and patentable over the Goyal et al. patent.

Accordingly, Applicant respectfully requests reconsideration and removal of this rejection.

Conclusion

In view of the above amendments and remarks, Applicant respectfully submits that the rejections have been overcome and that the present application is in condition for allowance. Thus, a favorable action on the merits is therefore requested.

Please charge any deficiency or credit any overpayment for entering this Amendment to our deposit account no. 08-3040.

Respectfully submitted,
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